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### NEST RECORDS FOR THE KING VULTURE (*Sarcoramphus papa*) IN VENEZUELA

MARSHA A. SCHLEE

*Muséum National d'Histoire Naturelle, Ménagerie du Jardin des Plantes, 57 rue Cuvier,  
75231 Paris Cedex 05, France*

**KEY WORDS:** *king vulture; nest sites; Sarcoramphus papa; Venezuela.*

The natural history of the king vulture (*Sarcoramphus papa*) is not well-known. Although nestling plumage development and threat behavior have been documented from a nest in Venezuela (Ramo and Busto 1988), the first detailed accounts of greeting ceremonies and courtship (Schlee 1987) as well as nest construction, incubation, parental care, and ontogeny of young (Schlee 1994) come from captive birds.

Several nest records indicate that king vultures are ground-nesters. In dense, wet second-growth forest in Panama, one nest was located in a rotted tree stump 30 cm above ground, and another in a scrape made in the soil and litter at the base of a palm (Smith 1970). A downy young was found wandering about on the ground in primary forest on Barro Colorado Island (Lundy 1957), and the presence of excrement and bits of bone and fur at the base of a tree indicated that this spot was probably the actual nest (C.B. Koford unpubl. data). A more recent finding in dry tropical forest in the Andean piedmont of Venezuela, however, shows that the species also uses large

holes in trees, the nest having been located 10.5 m above the ground (Ramo and Busto 1988). This paper describes two nest sites found in the northern Llanos of Venezuela.

#### STUDY AREA AND METHODS

Observations were made at the ranches Hato Don Miguel and Hato El Portón, located 35 km and 17 km, respectively, east of Altagracia de Orituco (9°55'N, 66°16'W) in the northern part of the state of Guárico not far from the Cordillera de la Costa. Elevations range from 200–500 m, the nest sites being located at approximately 290–300 m. Much of the dry deciduous forest that once covered the area has been cleared for the cultivation of corn (*Zea mays*) and milo (*Sorghum* sp.) and for cattle grazing; El Portón, however, still has large forest remnants. The area has highly mixed woodlands with many of the trees being less than 25 m in height. At least 10 tree species are common to both ranches: araguaney (*Tabebuia chrysantha* and *T. serratifolia*), locust-tree (*Hymenaea courbaril*), cedro (*Cedrela odorata*), ox-hoof tree (*Bauhinia variegata*), blood tree (*Croton gossypifolius*), hog plum (*Spondias cytherea*), onion cordia (*Cordia alliodora*), cassia (*Cassia moschata*), and flame tree (*Delonix regia*). Four other species can be found at Hato Don Miguel: erythrina (*Erythrina poeppigiana*), silk cotton tree (*Ceiba pentandra*),

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sand-box tree (*Hura crepitans*), and rain tree (*Samanea saman*). Annual precipitation averages 1004 mm and the area is not subject to flooding. The dry season extends from November or December to May or June. Annual temperatures average 25.5°C, peaking in April ( $\bar{x} = 27.6^\circ\text{C}$ ) and lowest in August ( $\bar{x} = 24.2^\circ\text{C}$ ).

In July 1994, I visited the nest site that had been reported to me earlier at Hato Don Miguel (J.L. Gómez pers. comm.). At that time I learned that a tame, all-black juvenile king vulture had just been recovered by a group of field workers near Altagracia. With the help of the local population, the itinerary of the young bird was traced back to Hato El Portón. There, details of the discovery of the nest and its outcome were provided (R. Itriago pers. comm.), and I was given the opportunity to inspect the site. According to the ranchers, the nest had not undergone noticeable deterioration since its finding in 1993, and adult king vultures were seen in the area again during spring 1994. The ages of the young birds were determined from photographs showing growth and feather development in two young reared at the Paris Menagerie.

#### RESULTS AND DISCUSSION

**Hato Don Miguel.** At the end of March/beginning of April 1990, a young king vulture, 3–3.5 mo old, was found inside a small cave located 2–3 m up the side of a wooded ravine having moderate understory. A dam was being constructed at less than 100 m from the site to create a lagoon, and the creek in the gully had been dry for several months. The ravine was bordered on one side by a large tract of undisturbed forest which was subsequently cleared for cultivation and on the other by fields of sorghum. Upon discovery, the young bird emitted a soft painful cry and looked like it was about to vomit. From the description, the young king vulture was giving the hooked-neck alarm display characteristic of nestlings (Lundy 1957, Ramo and Busto 1988, Schlee 1994). The parents were not in sight.

At the time of the discovery, the cave was thought to be the nest. However, it was very clean—no noticeable accumulation of feces, no pellets or remains of food. Moreover, if terrain and site permit, king vulture chicks tend to stray away from the nest at 30–35 d age (Schlee 1994) and wander about on the ground until upward climbing abilities mature and finally they are capable of their first flight (C.B. Koford unpubl. data, Lundy 1957, Schlee 1994). Consequently, I believe the cave served as a secondary refuge, the actual nest probably being located somewhere in the ravine. Considering the age of the young bird, the egg would have been laid in October at the end of the rainy season.

**Hato El Portón.** In January 1993, a nest with one egg was discovered at the edge of a large tract of forest in fairly

new tree growth about 4 m from a cornfield, but it was not visible from that side (Fig. 1A). It was situated at ground level, the terrain being about 60 cm lower than that of the adjacent path and field. The egg was at the back of a natural recess, about 30 cm high, formed in the logs and branches that had been piled over the base of a felled, uprooted tree (Fig. 1B). Vegetation had started to cover the material, which was decomposing. The interstices were filled with fallen leaves and the floor of the cavity was covered with humus. The recess narrowed in the back and was just wide enough for an adult king vulture to position itself for incubating.

In March, since the adults had not been seen for several days, the nestling was taken to be hand-reared. The chick was able to stand and walk on its toes, a behavior that appears at 20–23 d (Schlee 1994), and from photographs it was identified as about 30 d old. Thus, the egg would have been laid in December at the start of the dry season, which corresponds to the approximate nesting period reported by Ramo and Busto (1988). The juvenile was released the following year because it ate “too much meat” and had become a nuisance by tearing up clothes and closely following people around, behaviors thought to be potentially dangerous for children. Upon release, however, the young bird went to neighboring farms looking for food and seeking out the company of human beings. This behavior was probably related both to imprinting and to the length of the post-fledging dependence period—young king vultures stay with their parents for at least 1 yr (Clinton-Eitniear 1987).

**Conclusions.** In both of the cases described, the king vultures nested at the periphery of large, relatively undisturbed forest remnants but close to human activities. On one hand, these data lend support to the assertion that the species is forest-dependent, persisting in face of forest fragmentation only if large patches of forest remain (Stiles 1985). Note that in the northern Llanos of Venezuela (Ellis et al. 1983) as well as in the western Orinoco Basin (Reid 1989), king vultures have mainly been seen as scattered pairs or individuals flying over mountainous forest with agricultural clearings, gallery and flooded forest as well as forest/savanna mosaic dominated by forest. On the other hand, the nearness of their nests to human activities is rather surprising. Unlike the smaller cathartids, the king vulture is reported as not adapting well to human presence (Clinton-Eitniear 1986), and as being more frequently seen in heavily forested areas that do not have permanent human occupation (Whitacre et al. 1991, Berlanga and Wood 1992). The pair or pairs in my records, however, may have been showing fidelity to a nest site or nesting territory used prior to the changes in the surrounding habitat.

Roadside counts of Falconiformes in northcentral Ven-

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Figure 1. King vulture nest site at Hato El Portón: (A) View from the back showing proximity to cultivated areas. Arrow points to position of nest; some of the outside vegetation was cut back to expose it. (B) View from inside the forest. Arrow points toward the semi-open passage leading to the nest cavity underneath the rotting branches. Photos taken during the rainy season.